Inventor: Bhattacharya et al. Examiner: Wm. P. Fletcher III

REMARKS/ARGUMENTS

In the Claims:

Claims 1, and 3-101 remain pending in the present application. Claims 1, 4-9, 12, 13, 30, 38-46, 62, 64, 65, 69, 73, 74-80, and 93 have been amended.

Objection to Claims 38 and 74

The Examiner objected to claims 38 and 74 as containing language that lacks a proper antecedent basis, and additionally objected to claim 74 as being misnumbered. Applicant has amended claims 38 and 74 to more clearly describe the present invention. Claim 74, as filed, has also been properly renumbered as claim 73. Consequently, Applicant submits that claims 38 and 74 now have a proper antecedent basis, and the claims are properly numbered. As such, the Examiner's rejection may now be properly withdrawn.

Rejection of Claims 9, 12, 64, 65, 69, and 74-101 Under 35 U.S.C. § 112

The Examiner rejected claims 9, 12, 64, 65, 69, and 74-101 under 35 U.S.C. § 112, second paragraph as being indefinite. Applicant has amended claims 9, 12, 64, 65, 69, and 74 to more clearly describe the present invention. Consequently, Applicant submits that the rejected claims have been rendered definite, and the Examiner's rejection may now be properly withdrawn.

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Rejection of Claims 1-19, 21-23, 29-55, 58-60 and 66-73 Under 35 U.S.C. § 103(a)

The Examiner rejected claims 1-19, 21-23, 29-55, 58-60 and 66-73 under 35

U.S.C. § 103(a) as being unpatentable over Hubbard et al. (WO 97/47678 A1)) in view

of Cuellar et al. (US 5,482,745). Applicant has amended independent claims 1 and 38.

As Applicant does not believe Hubbard et al. in view of Cuellar et al. to teach or suggest

the subject matter of claims 1-19, 21-23, 29-55, 58-60 and 66-73, as amended, the

rejection is respectfully traversed.

The present invention is directed to a method of improving the adhesion between

the surface of a thermoplastic polyolefin element (plastic element) and a coating

material, namely paint, applied thereto. The method of the present invention operates

by applying an adhesion promoter mixture to the plastic element, and then drying the

plastic element so that a dried layer of adhesion promoter remains coated thereto.

Consequently, as is well known and would be understood by one skilled in the art, any

defects (e.g., runs, sags, streaks, etc.) in the dried layer of adhesion promoter will

manifest themselves in the subsequently applied paint coat. This is also true of primer

coatings and virtually any other materials that might be applied to an object prior to a

paint coat. As such, it is of great importance to the present invention that the mixture be

applied in a manner that minimizes or, more preferably, eliminates, defects in the

resulting dried layer of adhesion promoter.

The present invention employs various devices and techniques to minimize or

eliminate defects in the dried adhesion promoter layer including, for example: applying

the mixture to the plastic element within an application enclosure having a controlled

atmosphere; cooling the plastic element to approximately the temperature within the

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application enclosure; regulating one or more of a flow rate of the mixture, a discharge

pattern of spray nozzles used to apply the mixture, an angle of the spray nozzles, a

distance of the spray nozzles from the plastic element, and/or the orientation of the

plastic element; employing a gravity tank to deliver the mixture to the spray nozzles; and

drying the mixture-covered plastic element in a controlled drying enclosure. While the

method of the present invention helps to ensure that the entirety of the plastic element is

substantially coated with the mixture, it also operates to minimize agitation of the mixture

as it is delivered to the application device and as it contacts the plastic element. The result

of the method of the present invention is a plastic element that is thoroughly covered by a

dried adhesion promoter layer with minimal or no defects that can be transferred to the

subsequently applied paint coat.

Hubbard et al. does not teach a method by an adhesion promoter layer can be

deposited to the surface of a plastic element while minimizing or eliminating defects

therein, because such is not of concern in Hubbard et al. Hubbard et al. is directed to

producing an improved barrier layer (i.e., a barrier layer that exhibits improved vapor

barrier performance) on a plastic element. This is said to be accomplished by applying

and drying a primer composition on the plastic element and then applying a barrier coating

solution. The goal of Hubbard et al. is to produce packaging that will improve the shelf life

of foodstuffs. Thus, the primer composition and the barrier solution are typically applied to

articles such as films, bottles, jars, plastic containers, blisterpacks and lidstocks, which are

subsequently used to store food (see page 11, lines 25-30). Consequently, defects in the

primer layer of Hubbard et al. are not likely to be noticed in the final product, nor would

such defects be of any real consequence. The fact that Hubbard et al. states the primer

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layer may be applied by any technique known to those of skill in the art supports this

conclusion. Certainly, application of a primer or an adhesion promoter to a plastic element

by means of a roller would not produce acceptable results if a paint coat is to be

subsequently applied thereto.

Additionally, the method of the present invention preferably applies the adhesion

promoter to the plastic element via one or more nozzles that allow the adhesion promoter

to be dispensed at a relatively high flow rate. As opposed to being atomized and sprayed

onto the plastic element like a typical paint or primer material, the method of the present

invention dispenses the adhesion promoter from the nozzle(s) in a manner that cause it to

flow over the surfaces of the plastic element upon contact therewith. This technique has

been found to best produce an acceptable adhesion promoter layer after drying of the

plastic element. For example, the flow rate of adhesion promoter through each nozzle

may be between approximately 0.5-2.5 liters per minute - which flow rate is significantly

higher than that of conventional spraying methods (see e.g., paragraphs 037-038 and

042-043).

Hubbard et al. does not teach or suggest such an adhesion promoter application

method. Hubbard et al. does state that a primer layer may be applied by techniques such

as roll coating, spray coating, and dip coating. However, aside from being impractical for

use with the method of the present invention, due to their low flow rate, none of these

coating techniques would cause the amount of agitation to the adhesion promoter that is

produced by the present application method. Thus, while roll coating, dip coating, or spray

coating will not produce an acceptable adhesion promoter layer for other reasons, they will

not generally cause the splashing and/or foaming experienced during adhesion promoter

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application according to the method of the present invention. Consequently, Hubbard et

al. does not teach or suggest the adhesion promoter application method of the present

invention nor, obviously, does Hubbard et al. teach or suggest how such an application

method can be employed while causing minimal or no defects in a subsequently dried

adhesion promoter layer.

Combining Cuellar et al. with Hubbard et al. does not overcome the deficiencies

thereof. Cuellar et al. is not directed to a method of application like that taught by the

present invention, nor to overcoming problems associated therewith. Rather, Cuellar et al.

teaches only a spray coating process that takes place in a closed coating chamber. The

spray coating process employed in Cuellar et al. is employed primarily to impart a paint

coat to various vehicle components. Cuellar et al. states that a spray nozzle tip is used to

atomize the coating material at a predetermined pressure, and to apply the coating

material to the components. Thus, the actual coating material application process taught

by Cuellar et al. is a typical painting process. As such, the combination of Cuellar et al.

and Hubbard et al. still does not teach or suggest a method by which a supply of an

adhesion promoter mixture can be flowed over a plastic element while creating minimal or

no defects in a dried adhesion promoter layer that remains on the plastic element.

Having discussed both Hubbard et al. and Cuellar et al. in detail above, Applicant

submits that there are material differences between the teachings thereof and the method

of the present invention. As such, Applicant respectfully submits that Hubbard et al. in

view of Cuellar et al. cannot support a rejection of claims 1-19, 21-23, 29-55, 58-60 and

66-73 under 35 U.S.C. § 103(a).

Rejection of Claims 20, 56 and 57 Under 35 U.S.C. § 103(a)

The Examiner rejected claims 20, 56 and 57 under 35 U.S.C. § 103(a) as being

unpatentable over Hubbard et al. in view of Cuellar et al., and further in view of

Browning (US 4,452,171). Applicant has amended independent claims 1 and 38 to

more clearly describe the subject matter recited therein. As Applicant believes

independent claims 1 and 38 to now recite allowable subject matter, claims 20, 56 and

57, which depend therefrom, would also be allowable.

Rejection of Claims 24, 25, 61 and 62 Under 35 U.S.C. § 103(a)

The Examiner rejected claims 24, 25, 61 and 62 under 35 U.S.C. § 103(a) as

being unpatentable over Hubbard et al. in view of Cuellar et al., and further in view of

Bartow (US 5,230,739). Applicant has amended independent claims 1 and 38 to more

clearly describe the subject matter recited therein. As Applicant believes independent

claims 1 and 38 to now recite allowable subject matter, claims 24, 25, 61 and 62, which

depend therefrom, would also be allowable.

Rejection of Claims 26-28 and 63-65 Under 35 U.S.C. § 103(a)

The Examiner rejected claims 26-28 and 63-65 under 35 U.S.C. § 103(a) as

being unpatentable over Hubbard et al. in view of Cuellar et al. and Bartow, and further

in view of Kaneski et al. (US 5,575,560). Applicant has amended independent claims 1

and 38 to more clearly describe the subject matter recited therein. As Applicant

believes independent claims 1 and 38 to now recite allowable subject matter, claims 26-

28 and 63-65, which depend therefrom, would also be allowable.

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Rejection of Claims 74-88, 90-92, and 95-101 Under 35 U.S.C. § 103(a)

The Examiner rejected claims 74-88, 90-92, and 95-101 under 35 U.S.C. §

103(a) as being unpatentable over Hubbard et al. in view of Cuellar et al., and further in

view of Mashima et al. (WO 97/31694 A1, reference made to US 5,919,288 as the

English equivalent). As Applicant does not believe Hubbard et al. in view of Cuellar et

al. and Mashima et al. to teach or suggest the subject matter of claims 74-88, 90-92,

and 95-101, the rejection is respectfully traversed.

Hubbard et al. and Cuellar et al. have been discussed in detail above. Mashima

et al. teaches a method for recovering excess water-based paint from a paint booth

having a recirculating water curtain. The Examiner asserts that Mashima et al. also

shows a supply header in Figure 1 thereof, such as may be used by the method of the

present invention. However, Applicant is unable to identify a supply header or another

similar component in Figure 1 of Mashima et al. Nor does the written description of the

invention discuss the use of a supply header.

In the present invention, a supply header may be located in the application

portion of the enclosure to receive the adhesion promoter mixture and apply it to the

plastic element. The supply header may have one or more nozzles for distributing the

mixture over the plastic element. In one embodiment, the supply header receives the

mixture from a gravity tank, in which case the mixture is also dispensed from the supply

header by the force of gravity. Mashima et al. does not teach or suggest such an

application method. In Mashima et al., the paint to be applied to the substrate (3)

located in the spray booth (1) is supplied from a (presumably) pressurized paint tank

(9), through a spray gun (2) connected thereto. No supply header is shown.

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In any event, even if Mashima et al. were to teach the use of a supply header.

the combination of Hubbard et al., Cuellar et al., and Mashima et al., still does not teach

a method for applying an adhesion promoter mixture as described above with respect to

the discussion of Hubbard et al. and Cuellar et al. Specifically, Mashima et al.

combined with Hubbard et al. and Cuellar et al. still does not teach or suggest a method

by which a supply of an adhesion promoter mixture can be flowed over a plastic element

while creating minimal or no defects in a dried adhesion promoter layer that remains on

the plastic element. Consequently, Applicant respectfully submits that Hubbard et al. in

view of Cuellar et al., and further in view of Mashima et al. cannot support a rejection of

claims 74-88, 90-92, and 95-101 under 35 U.S.C. § 103(a).

Rejection of Claim 89 Under 35 U.S.C. § 103(a)

The Examiner rejected claim 89 under 35 U.S.C. § 103(a) as being unpatentable

over Hubbard et al. in view of Cuellar et al., and Mashima et al., and further in view of

Browning. Applicant has amended independent claim 74 to more clearly describe the

subject matter recited therein. As Applicant believes independent claim 74 to now recite

allowable subject matter, claim 89, which depends therefrom, would also be allowable.

Rejection of Claims 93 and 94 Under 35 U.S.C. § 103(a)

The Examiner rejected claims 93 and 94 under 35 U.S.C. § 103(a) as being

unpatentable over Hubbard et al., in view of Cuellar et al., and Mashima et al., and

further in view of Bartow. Applicant has amended independent claim 74 to more clearly

describe the subject matter recited therein. As Applicant believes independent claim 74

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to now recite allowable subject matter, claims 93 and 94, which depend therefrom.

would also be allowable.

CONCLUSION

Applicant has amended claims 1, 4-9, 12, 13, 30, 38-46, 62, 64, 65, 69, 73, 74-

80, and 93, and has canceled claim 2. As a result of the amendments, claims 1, and 3-

101 remain pending in the present application. Applicant has also distinguished the

subject matter of the present invention over the teachings of the references cited as

prior art by the Examiner.

Therefore, Applicant respectfully submits that the present application is now in

condition for allowance, and entry of the present amendment and allowance of the

application as amended is earnestly requested. Telephone inquiry to the undersigned

in order to clarify or otherwise expedite prosecution of the present application is

respectfully encouraged.

Respectfully submitted,

Date: 07-13-04

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